Notes for the "xls2ens" python program

This program can be run with python 2.7.6, but not with python 3.0.x. The user needs to install the python xlrd module from: http://www.python-excel.org.

This Python program creates an ENSDF-format file from tabulated data in an EXCEL file. It was originally written for compiling XUNDL files.

1, the input excel file

This file must at least have two sheets: one named "**Header**" and the other one named "**Data**" or "**Data_by_gamma**". The details of each sheet are given below.

2, the "Header" sheet

It must have two columns and must have at least six rows, as shown below. The names of the first column must be the same as shown below. Order and case don't matter. The content in the second column should follow the example below. It can have optional rows for general level and gamma comments.

col1	col2
Nuclide	178Hf
Reaction	174YB(12B,xng)
NSR	2011Ko16
Reference	F.G. Kondev et al., Phys. Lett. B492 (2011) 112-124
Comment	2011Ko16: This was obtained using data …….
Compiler	Compiled by W. Murray (DePaul U/ANL) and F.G. Kondev (ANL): November 13, 2011
CL	E$From a least-squares fit to gamma-ray energy

3, the "Data" sheet

✓ The data are in order of level energies. The first column is for level energies in ascending order.
✓ Column names have to be selected from the list below, otherwise the data will not be read properly. Values can be given as "value(uncertainty)" in one column , or 'value' and 'uncertainty' in separate columns. For example, for a gamma energy EL=274.2(4), one can put "274.2(4)" in column "EL", or "274.2" in column "EL" and "4" in column "DEL". But the mixture of the two styles in the same table is not allowed.
✓ Uncertainty must be in ENSDF format. For example, level energy 274.2(4) can be put in one column "EL" as "274.2(4)" or in two separate columns "EL" and "DEL" as "274.2" and "4", respectively. Other examples, "<=1" in "RI" column or "1" and "<=" in "RI" and "DRI" columns, respectively. Similar for "~1".
✓ Records of a gamma from a level must be put in the same row as the level record.

- ✓ Records of a decay from a level must be put in the same row as the level record.
- ✓ If there are more than one gamma from a level, the records for additional gammas can be put in new rows with blank level fields, except the field for level energy, which tells the program which level these gammas are from.
- ✓ If the level energy field for gamma record is blank, this gamma is treated as from the level in the previous row, and so on.
- ✓ For unplaced gamma, put "unplaced" in the field of level energy.
- ✓ Multiple flags are allowed in 'LFLAG', 'GFLAG', 'DFLAG' and 'AFLAG' fields. If this is the case, the first flag will be put in column 77 (78 for alpha flag) and the rest will be put in continuation record following 'FLAG='. If there is a band flag, it will be put in column 77 and all 'LFALG' will be put in continuation record.

4, the "Data_by_gamma" sheet

- ✓ The data are in order of gamma energies. Level energies are in first column. Gamma energies are in the column in ascending order after level records.
- ✓ The contents and rules are the same as the "Data" sheet.
- ✓ The ground state data should be put in the first row with blank gamma energy field.

List of pre-defined column names

For Level record:

Column name	description	Column name	description
'EL','DEL'	Level energy	'BAND','LFLAG'	Band flag, and level flags
'JPI'	Spin-parity	'CL'	Level comment
'T','DT'	Half-live	'LQUE'	Question mark for level
'TU'	Half-live unit	'LCD1','DLCD1'	Data1 to be put in level comment
'L'	Angular mom.	'LCD2','DLCD2'	Data2 to be put in level comment
'S','DS'	C2S factor	'LCD3','DLCD3'	Data3 to be put in level comment
'ISPIN'	isospin	'BE1UP','DBE1UP','BE1WUP', …	Transition prob., up to E5 and M5

For 'CL', the ENSDF convention should be followed. For example, "E$...." is for level energy comment, "$..." is for general level comment, and so on. Right now, only one comment is allowed.

Columns "LCD1" and "DLCD1" is for data value and uncertainty to be put in the level comment with the name="LCD1", for example, the output will look like "178HF CL $LCD1=value uncertainty". Then one can easily replace all "LCD1" by the desired name. Right now, maximum of three such data are allowed to be put this way. It is useful to put data like level widths in the comment.

For Gamma record:

Column name	description	Column name	description
'EG','DEG'	gamma energy	'GFLAG'	gamma flags
'RI','DRI'	Gamma intensity	'CG'	Gamma comment
'MUL'	Multi-polarity	'GQUE'	Question mark for gamma
'MR','DMR'	Mixing ratio	'GCD1','DGCD1'	Data1 to be put in gamma comment
'CC','DCC'	Conversion coeff.	'GCD2','GLCD2'	Data2 to be put in gamma comment
'TI','DTI'	Total intensity	'GCD3','GLCD3'	Data3 to be put in gamma comment
'DCO','DDCO'	DCO ratio	'BE1','DBE1','BE1W',...	Transition prob., up to E5 and M5
'POL','DPOL'	polarization	'A2','DA2',...	Angular distribution coeff. (up to A6)
'ECC','DECC'	Exp. total CC	'EKC','DEKC','ELC',...	Sub-shell exp. CC (up to M shell)

The usage of 'CG' and 'GCD1' is the same as 'CL' and 'LCD1' for the level record.

For Decay record:

Column name	description	Column name	description
'EB','DEB'	Beta energy	'EA','DEA'	Alpha decay energy
'IB','DIB'	Beta branch (B-)	'IA','DIA'	Alpha decay branch
'IBE','DIBE'	Beta branch (B+)	'HF','DHF'	Alpha decay HF factor
'IE','DIE'	EC branch	'AFLAG'	Alpha decay flags
'LOGFT','DLOGFT'	Logft value	'DQUE'	Question mark for decay record
'DFLAG'	Decay flags (B+/-,EC)	'CA'	Comment for alpha decay record
'CB','CE'	Comments for B-,B+/ EC		

In-record flag for B+,B- and EC is at column 77, but it is 78 for alpha decay.

5, Usage
   option 1: read the data sheet "Data" in order of level energies. In the command window, enter:

   python PATH_TO_PROGRAM/xls2ens.py

   then after prompt, enter the EXCEL file name.

   option 2: read the data sheet "Data_by_gamma" in order of gamma energies. Just add "G"

after entering the EXCEL file name in optioin 1. That is:

python PATH_TO_PROGRAM/xls2ens.py

then after prompt, enter the EXCEL file name+whitespace+"**G**".

6, the output file is "outfile.ens".

Jun Chen
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